

I thank the authors for their comprehensive corrections made to the manuscript. In my mind, all corrections that I have suggested were either taken into account, or the authors have given sufficient reason not to use the suggestions.

I would like to reply to one of the authors' comments:

"Referee Duursma and referee De Kauwe both make a similar point with reference to analytical stomatal conductance models derived from water-use efficiency optimization theory, particularly the Medlyn et al stomatal model (Duursma was second author on that manuscript and De Kauwe has authored subsequent studies with Medlyn using the model). In these comments they ask us to justify why we do not use their stomatal conductance model."

It was not my intent to ask the authors to use our model; if this was the case I would have simply asked that question directly. I was trying to find out the justification for a full numerical optimization, which seems a bit overkill. The response that the computing time is very minor compared to other parts of CLM makes sense to me. It should also be pointed out that the model of Medlyn et al. (2011) ("our model") is an approximation to the full numerical model, and in some cases the approximation is not that great.

I would also like to reply to the following comment regarding the Medlyn 2011 model:

"Since the referees raise the issue, it is worth pointing out that the Medlyn model is derived from the Farquhar photosynthesis model based on water-use efficiency optimization, but only for RuBP-limited (light-limited) assimilation. They argue that this is appropriate, because much of the canopy is light-limited (see also Medlyn et al. 2013; *Agric. Forest Meteorol.*, 182/183, 200-203). More complex stomatal conductance models are obtained for Rubisco-limited assimilation (Katul et al. 2010; *Annals of Botany*, 105, 431-442) or co-limited assimilation (Vico et al. 2013; *Agric. Forest Meteorol.*, 182/183, 191-199),"

We argue that solving for optimal stomatal conductance (g_s) under uBP-limited photosynthesis only, not because "much of the canopy is light-limited", but because this gives the right response to elevated CO₂ (as described in detail in Medlyn et al 2013, which they cite here) – whereas using the Rubisco limitation gives the wrong-way response (which then requires a fudge factor a la Katul et al. to give the right-way response). This can certainly still be debated, but it is important to not misrepresent the reasons for this choice in the model (see also Duursma et al. 2013 *AgForMet* 168:168-176 for some discussion on this). A finer point is that we think it is certainly possible that stomata behave as if they are always RuBP limited (even when photosynthesis is in fact limited by some other factor).